
Xanadu Light: Overview

© 1994 Theodor Holm Nelson, Xanadu™ On-Line Publishing, 3020
Bridgeway #295, Sausalito CA 94965. Tel. 415/ 331-4422, fax 415/ 332-
0136.

"Xanadu," "Xanadu Light," "HyPerformance" and the Eternal
Flaming X symbol are trademarks of Project Xanadu.

Xanadu has long been a software design, an ideal, and an action plan for a
worldwide linked electronic publishing system.

(Note that the system was also designed from the beginning for version
and document management on a personal and corporate scale, but
version management has been dropped from the current system. We
expect to put in a form of version management at a later time.)

Openness and Freedom

We believe the Xanadu system offers unique solutions to issues
of royalty, rights and re-use.

Our electronic publishing model has been unique: a scheme for
open, integrated universal electronic publishing with freedom for
anyone to publish. Anyone may publish any form of data, and
anyone may publish links to already-published material.

Perhaps most important, anyone may re-publish material already
on the network without restriction, excerpted at will and
presented in any new context. A few simple rules operate
automatically to maintain ownership, authorial credit and
accounting.

Really a Business Model; Implementation Secondary

Xanadu is a business model to achieve this openness and
freedom. It is a method for the sale of copyrighted material on
networks. All parties agree by contract to a standard form of sale
and re-use.

This is a highly-integrated business model based on an exact
delineation of parties, contracts, and arrangements. Rather than
being restrictive, however, this system defines an extremely
broad playing field for publication, communication, education,
scholarship, business communication, entertainment, multimedia,
and other art forms, and general use.

The type of implementation is secondary. Different
implementations and protocols may coexist and operate together
under this framework.

Mix-and-Match Boilerplate

The system is defined so that all parts of a published document may be purchased a la carte in pieces. Anything already published within the system may also be re-used and re-published with ease within the system. Thus text, graphics, audio, animations, simulations may be recombined on a mix-and-match basis. This is true for links as well.

Re-Use

All parties agree by contract that materials may be re-used freely, but only by virtual inclusion in new Xanadu documents. Thus everyone is free to use previous materials in new ways, but royalty and credit automatically go to the rightsholder.

Clean Data

Links and markers are local applicative substructures, and not embedded in any way. This better facilitates re-use of the material.

Automatic Royalty

Each time a customer buys a fragment of any data-- text, graphics, audio, 3D models, whatever-- a proportional royalty payment automatically goes from the customer to the publisher. Anything may be bought in small portions.

Licensed Service Providers

The plan has also been to license, or franchise, service providers, who will set up computers and data storage using our software, and make the service available to customers locally and internationally. Customers may modem in to their local service providers. The service providers, in turn, will be able to send for materials they do not have locally.

Xanadu Light

XANADU LIGHT is the new implementation now being planned for implementation with conventional database on the Internet.

What follows is a design specification for that Xanadu Light.

00. THE BUSINESS MODEL

The service provider is not responsible for the contents.

The publisher is responsible for contents, and pays for storage.

The reader/user pays for delivery, including both

a service charge to the service provider, and

a royalty to the publisher. This royalty is exactly proportional to the number of bytes, at the royalty price set by the publisher on that document, or set by the publisher on a particular segment of that document.

THE CONTRACTS

Contracts bind the system.

Publisher --

is responsible for the contents and relinquishes context control of the materials in the Xanadu network in return for royalty and credit. Publisher retains all other rights.

Reader --

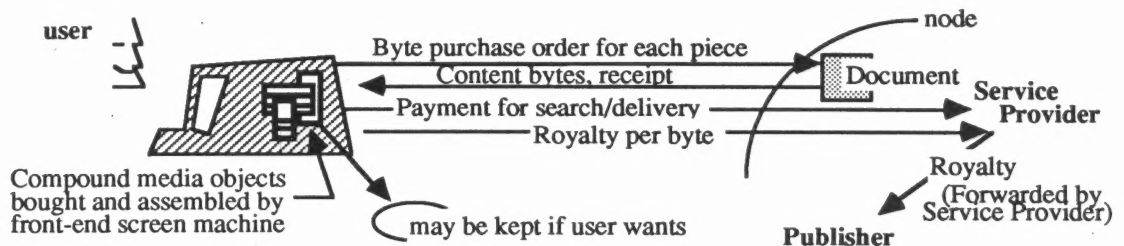
agrees to terms of purchase, and agrees not to redistribute the materials except through transclusion into documents published within the Xanadu network.

Service provider --

agrees to maintain integrity of the document, use the software provided, and remand royalties and other payments as called for.

0. THE MODEL OF INTERACTION

The user perceives a point-and-click universe. In actuality, each click makes another small purchase of content bytes or links from the network.



THE RECEIPT

A receipt will be sent with each portion. This will assist the user, or the user's system, in filing the portion, if the user chooses to keep it. The receipt will also authenticate, by means of a hash code, the user's legitimate purchase of this portion.

CLIENT SOFTWARE

Basic purchase will be simple, allowing a minimal interface for purchasing portions. A higher-performance interface will be point-and-click with material appearing in separate Mac-style windows.

RECOMMENDED LAYOUT

There have been various complex arrangements (especially SGML) for the framing and presentation of text, especially local assignment of layouts to paragraph types. We will have such an arrangement, but within the framework of local applicative substructures.

THE HIGH-PERFORMANCE CLIENT

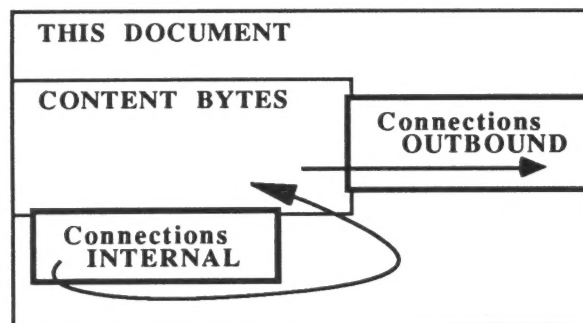
A very high-performance interface will also be specified at a later time.

For a higher level of performance, with panning, scrolling and zooms, as well as other effects, we will be specifying at a later time a high-performance client language called HyperFormance™. This will be closely related to multilayer compositing methods in video, and extend the video EDL (Edit Decision List).

1. GENERAL MODEL OF A DOCUMENT.

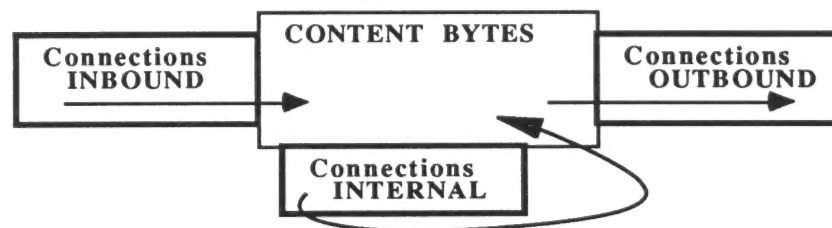
A document consists of contents bytes (text, graphics, etc., ORIGINATING IN THIS DOCUMENT), and connections both in and out of the document.

The structure of document connections is APPLICATIVE, meaning that no codes are embedded. Structure is managed within the database system.



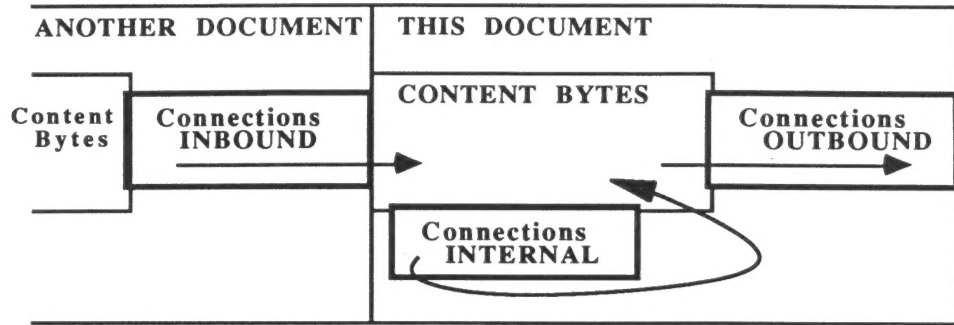
SYMMETRY

In relation to other documents, these connections create a symmetrical structure of connections. It is important to understand this symmetry, which we will discuss later.



OWNERSHIP OF CONNECTIONS

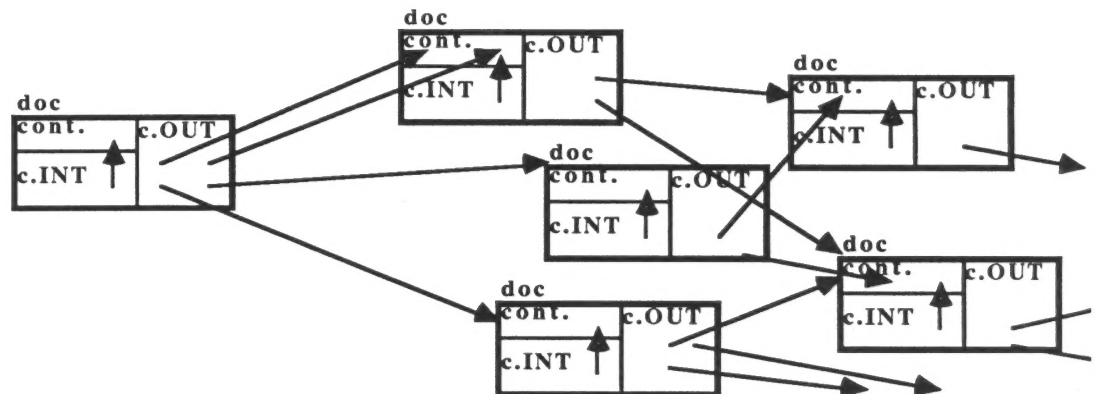
All connections are owned. One document's inbound connection is another document's outbound connection.



Connections into a document are owned by other documents where they originate.

THE PARTS MAKE A DOCUVERSE

Taken all together, these connected documents make up a docuverse. No other parts are needed.



2. TYPES OF CONNECTIONS

There are two types of connections: links and transclusions.

A link is an arbitrary connection of any type.

A transclusion means a new instance: "bring in this material here," even though place of origin is different.

TYPES OF CONNECTION

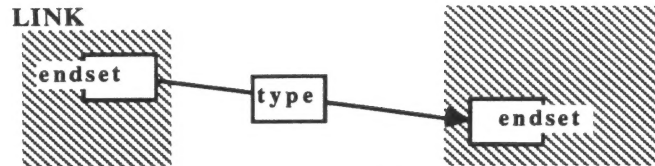
link



transclusion



LINKS.



A link is a connector, of arbitrary extensible type, between part of a document and another part of a document. The link may be within or between documents.

TYPES OF LINKS

There can be many types of link, in an ever-extensible list. A short beginning list:

- Subject (what commentator thinks this is about)
- Comment
- Disagreement
- Endorsement
- Evidence
- Example
- Endorsement
- Graphical illustration

LINK ENDSETS

The endset is the material a link is attached to at either end (eg text, graphic, "hot button").

In Xanadu Light, there will be many types of endsets. These types will simply tell the system where the link is considered to be attached.

ENDSET COUPLING TYPE

The endset coupling specifies how it is attached: to a point, to a span of bytes, an area of picture, etc. Various different coordinate-spaces may be defined for this coupling.

Couplings can also be Deep or Surface. Deep couplings reach to data structure, whereas surface couplings reach the result of projecting the data structure. Example: a deep coupling to a PostScript document would couple to text bytes inside the original PostScript code, a surface coupling would couple merely to an area of the output surface generated by the PostScript program.

LINK DIRECTIONALITY, VISIBILITY, FOLLOWABILITY

All Xanadu links can be seen from either end and followed from either end. Some people call this "bidirectional." This is incorrect. All our links are *bivisible* (can be seen from both ends) and *bifollowable* (can be followed from both ends).

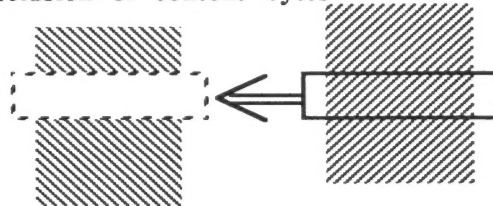
Links are usually *directional*, that is, asymmetrical in meaning. Very few link types are symmetrical ("is related to" would be one possible example).

TRANSLUSIONS

A transclusion means "bring this material in here." The formal definition: virtual inclusion across a document boundary. The material is not copied into the new document, but always newly-purchased from the original, or a functioning instance of the original.

- Content bytes, such as text and graphics, may be transcluded.

transclusion of content bytes



- Links themselves may be transcluded. In practice this means that a connector of a certain type, and either its from-set or its to-set is transcluded.

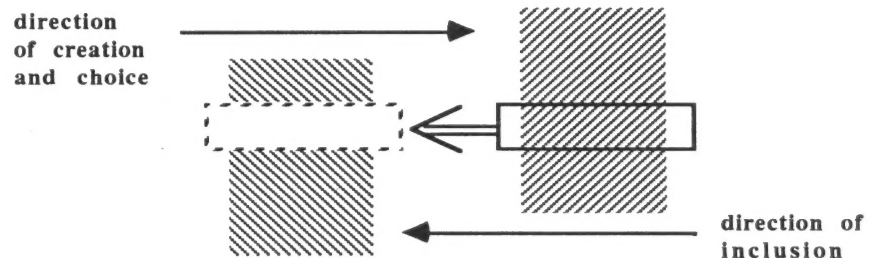
transclusion of link



DIRECTIONS OF A TRANSLUSION

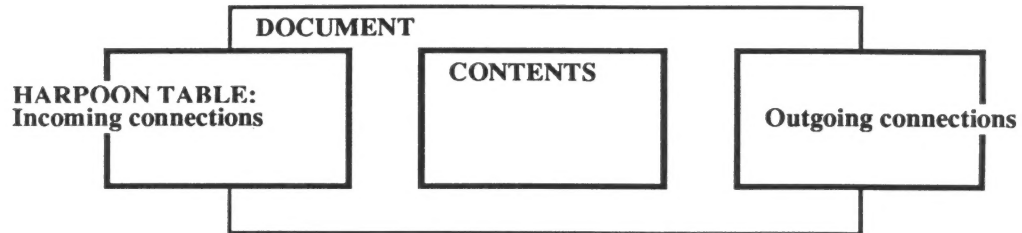
Transclusions, like links, are bivable and bifollowable. Transclusions are directional. To simplify things we say that a transclusion that brings in material is an outbound connection. But there are of course two directions: the direction in which the material has been chosen and the transclusion has been created (the *direction of creation and choice*), and the direction in which the material flows to be included (the *direction of inclusion*).

DIRECTIONS OF A TRANSLUSION

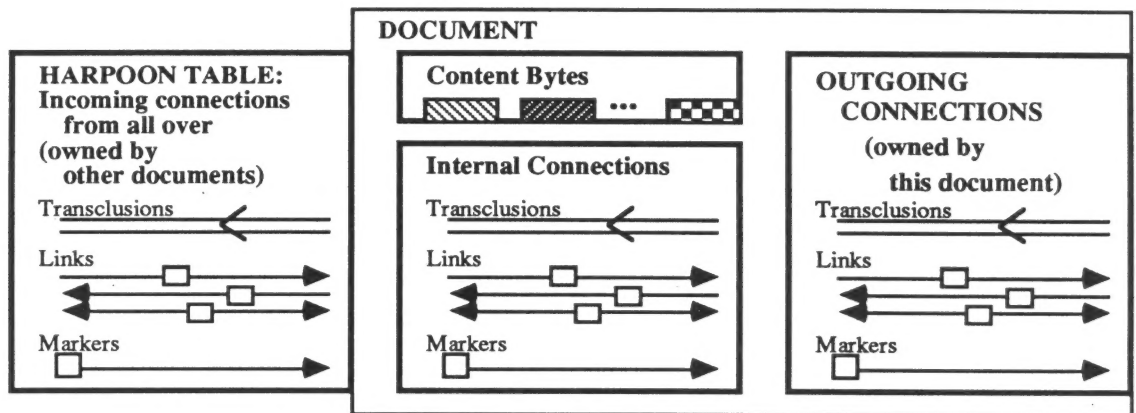


3. OVERVIEW OF A DOCUMENT IN DETAIL

Recall the symmetry of a document, mentioned earlier. We will be storing a document's incoming connections with it in what we will call a Harpoon Table.



Let us add to this overview the different parts we have discussed. The symmetry is still there, but with details showing the parts and their ownership.



4. STORAGE IN XANADU LIGHT

There will be two types of storage in Xanadu Light:

- content files, which may be anything that can be stored in a computer file;
- database tables, which are the means by which the system will keep track of document structures.

Xanadu Light: The Managed Unit and Its Table

Theodor Holm Nelson.

Xanadu™ On-Line Publishing

3020 Bridgeway #295, Sausalito CA 94965.

"Xanadu" and the Flaming-X symbol are trade and service marks of

Project Xanadu.

©1994 Project Xanadu.

THE THREAT OF COMPLEXITY

The different types of data-- harpoons, link tables, etc.-- suggest an alarming complexity.

I believe this danger can be overcome by reducing all document management to a single table, repeated in various ways to manage the different units of the system, including single incoming links and transclusions (harpoons). It will manage the different units in the same way.

This table is intended to manage documents, harpoons, barnacles, Xanamail and other units not yet invented.

A better term will come along, but let us call this for the time being the Managed-Unit Table.

EFFICIENCY LATER

The real issue is clean design. We can worry about efficiency later.

ÜBER-TABLE OF UNITS

Presumably there will be an overall table of Managed Units, which will state for each unit:

Native to this node?

Owner

Publisher, if any

Sponsor

Royalty Recipient

Expiration date of current payment

Independence of unit

- independent
- attached
 - harpoon (inbound)
 - barnacle (outbound)

Completeness of unit

- whole unit
- virtual subunit

THE MANAGED-UNIT TABLE: TWO TYPES OF ENTRIES

I suggest that the unit's table be able to contain two types of entries: the piece or segment, and the link.

This may or may not be good database form, but I think lends some clarity. The link spans refer to the virtual addresses of the pieces; therefore they are closely related.

They can of course be separated.

PIECES (or SEGMENTS)

A piece should know, in its row:

Piece number in this document

Its address in the network (canonical)

Auspices (same as link)

- Owner (copyright holder)
(May not be known if not on Xanadu system)
- Publisher
(May not be known if not on Xanadu system)
- Sponsor
(May not be known if not on Xanadu system)
- Basis of availability
(May not be known if not on Xanadu system)

Native to this document? (same as link)

- Yes
- No (transcluded)

Its address span in the document

Starting byte number in this document

Ending byte number in this document

LINKS

A link should know, in its row:

Auspices (same as piece)

- Owner (copyright holder)
(May not be known if not on Xanadu system)
- Publisher
(May not be known if not on Xanadu system)
- Sponsor
(May not be known if not on Xanadu system)
- Basis of availability
(May not be known if not on Xanadu system)

Its link number in this document

Native to this document? (same as piece)

- Yes
- No (transcluded)

Left Endset Coupling Type

- text span
- rectangle on screen
- (coordinate spaces and other couplings to be added to design later)

Left Endset

Parameters

(optional: Right Endset Coupling Type)

- text span
- rectangle on screen
- (coordinate spaces and other couplings to be added to design later)

(optional: Right Endset)

Parameters

Xanadu Light: Ownership, Sponsorship and Royalty

© 1994 Theodor Holm Nelson, Project Xanadu, 3020 Bridgeway #295, Sausalito
CA 94965. Tel. 415/ 331-4422, fax 415/ 332-0136.

"Xanadu" and the Eternal-Flaming-X symbol are trademarks of Project
Xanadu.

THE STANDARD ARRANGEMENT

The standard Xanadu model is that the publisher pays for storage, the user pays for delivery. But there are a number of interesting variants.

DIFFERENT AUSPICES FOR CACHING AND ROYALTY-- AND THE PARAMETERS

The ownership, sponsorship, publisher, and royalty policy of Xanadu-managed documents may all be distinguished by parameters in the Xanadu storage tables.

Here are some different arrangements.

OWNER, SPONSOR AND PUBLISHER

Let us distinguish between several roles with regard to a document.

An **owner** owns the copyright to the document, or has rights by virtue of contract or law.

A **sponsor** puts up the money for storing a copy.

A **publisher** takes the responsibility for the contents, and is ordinarily the sponsor as well, putting up the money for the document's storage. The publisher may or may not be the owner, but must have the right to publish the material.

In all cases, royalty goes to the document's publisher.

In the Xanadu publishing method, accounting is set up so that other parties may sponsor storage. This is the case for certain forms of private storage as well.

NATIVE PUBLISHING

The document is stored at a minimum of three stations for a minimum of three years. It may not be withdrawn or changed except through a suitable change mechanism, since users may have made connections to the current version.

- The sponsor for the minimum three stations is expected to be the publisher, although other parties may sponsor it instead for the same length of time.
- Royalty goes to the publisher.

BARNACLES

Barnacles are copies of transcluded material stored with the transcluding (out-binding) document.

- Sponsor of a barnacle is the out-binding publisher.
- Royalty goes from purchaser to original publisher.

HARPOONS

Harpoons are copies of links and transcluded material stored with the linked-to or transcluded document.

- Sponsor of a harpoon is the in-binding publisher.
- Royalty goes from purchaser to original publisher.

PRIVATE DOCUMENT (available only to owner)

A private document may only be visible to the owner.

- Sponsor of a barnacle is ordinarily the owner.
- There is no royalty.

PRIVATE DOCUMENT (privashed)

In privashing, a non-published document is made available to others by giving them password access as well. Our bookkeeping will allow royalties on privashed documents, and will keep track of sponsorship and royalty.

- Sponsor of a barnacle is ordinarily the owner.
- Royalty goes to the owner.

Note that a principal difference between published and privashed documents is that the privashed document may be changed or withdrawn at any time.

SLOSH COPY

A slosh copy of a published document, or part of a published document, may be made by any service provider at any other station. No prearrangement is necessary.

- Sponsor of a slosh copy is the service provider.
- Royalty goes to the publisher.

XANAMAIL™

Xanamail is our proposed scheme for having the sender of e-mail pay for its storage, and (if required by the receiver) pay a royalty to the receiver as well.

- Sponsor of Xanamail is the sender for one year. If the receiver does not discard it, sponsorship is automatically transferred to the receiver.
- Royalty goes from sender to receiver.
- Ownership is (according to U.S. copyright law) the sender, so that the receiver may not ordinarily publish it.

SITE LICENSE

If the publisher has approved in the contract, an organization may obtain a site license to a document for a period of time or in perpetuity. This is agreed to by the publisher under an additional optional clause in the publishing contract.

- Sponsor of a site-licensed document is the site-licensee.
- Royalty is prepaid by an estimation made by a special bureau on an actuarial basis, similar to insurance estimates.

PERSONAL COPY

A personal copy of a document, or part of it, is ordinarily purchased a piece at a time in an on-line session.

It is now owned for personal use by the purchaser, along with the right to print out one copy.

- There is no sponsorship if users maintain their own storage method.
- Royalty is already paid.

However, if the user licenses a copy of the Xanadu software for maintaining personal copies, they are then maintained by the same mechanism.

- Sponsorship is for one local copy and backup.
- Royalty is already paid.

Xanadu Light: Xploded Open Format

© 1994 Theodor Holm Nelson, Project Xanadu, 3020 Bridgeway
#295, Sausalito CA 94965. Tel. 415/ 331-4422, fax 415/ 332-0136.

"Xanadu" and the Eternal-Flaming-X symbol are trademarks of
Project Xanadu.

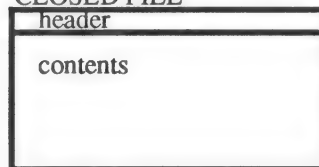
CLOSED FILES

Computer file formats are usually closed and encapsulated,
expecting to be modified only by controlled programs.

The system's creators expect that complete information packages
will be created and maintained by their applications, and

- no use will be made of the material except through these
specific applications;
- the contents are assumed to be unified and inviolable, and
are sealed within the file;
- the integrity of the data's interrelationships is assumed to
be assured by the file's closure.

CLOSED FILE



Examples are SGML, Microsoft Word, etc., and more recently
HTML, used by World Wide Web.

While we recognize and appreciate the intentions of these other
designs, this closed encapsulation is precisely what is unacceptable
to us about these other formats.

XANADU OPEN STRUCTURES

In the Xanadu system, however, we make the opposite assumption:
by common agreement, all published material becomes available

boilerplate for other use (but with royalty and credit to the originators).

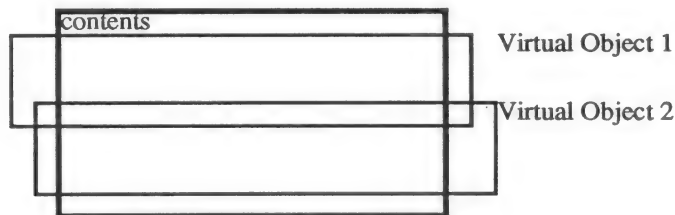
All material may thus be re-used freely, sampled and quoted and marked up in an unpredictable variety of ways, by an unpredictable variety of authors and in an unpredictable variety of new contexts. Thus all parts must be separately accessible and addressable for such re-use.

However, we are equally concerned for the integrity of the material: the integrity both of its original structure *and* of its re-uses.

VIRTUAL DOCUMENTS AND OBJECTS

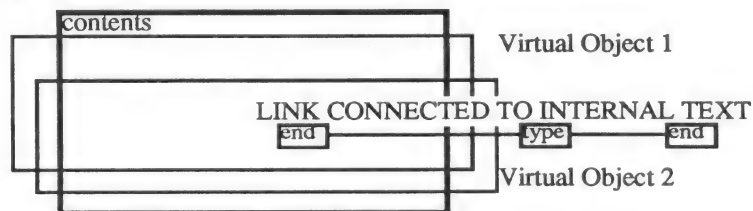
All units are virtual, and so the exact form of storage is a design choice. (We usually call a unit or object a "document," for sentimental and religious reasons.)

VIRTUAL DOCUMENTS SHARING CONTENTS



However, maintaining the integrity of these separate uses and structures is vital. Each virtual document has its specific name and owner, meaning the owner of that organization of the material. The contents may be owned by others.

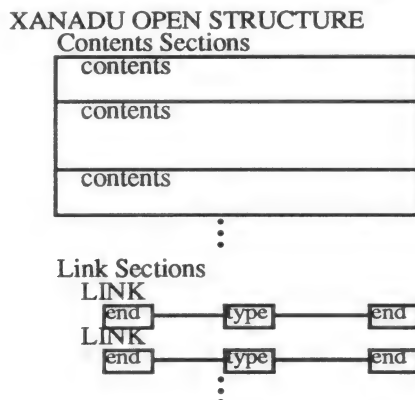
VIRTUAL DOCUMENTS SHARING CONTENTS AND LINKS



XPLODED OPEN FORMAT

Thus we need what we are calling Xploded Open Format, which will allow outside access of all parts to calling applications.

XANADU OPEN STRUCTURE



DETAILS

THE VIRTUAL ADDRESS SPACE

There is a linear address space simply in order to have addressability. This makes no assumption about the structures. Linear addressing of the virtual document is merely for convenience; we do not assume that presentation will be linear.

SEGMENTS

Segments are portions which are stored together and have a common ownership, sponsorship and royalty rate. Each segment has a particular starting position and length within the document's linear address space.

TEXT SEGMENTS

A text segment is a segment of raw ASCII, without formatting. The formatting is handled as links, so that

- the addressing is true content addressing, and not formatting
- the text can be reformatted differently in other uses
- it can be scanned by arbitrary programs without bumping into embedded codes

(GRAPHIC SEGMENTS, VIDEO SEGMENTS ...)

Graphic segments, video segments, etc., can be defined later.

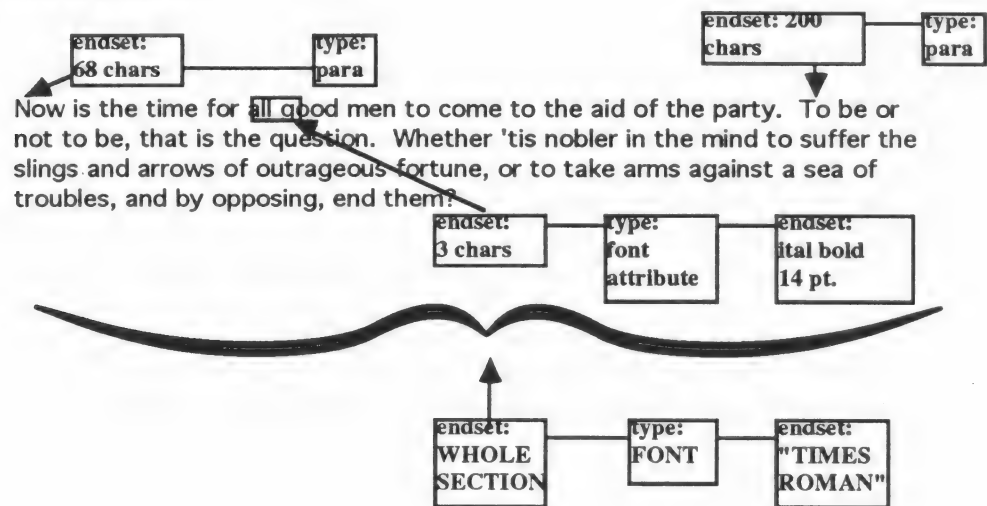
FULL TEXT FORMATTING

Full text formatting includes marker links, which are stored with links.

LINKS AND MARKERS

Links are connectors between parts of documents. They connect two places but also have a type.

Links may be used as connectors and as markers.

TEXT MARKERS**DISPLAYED RESULT OF TEXT MARKERS**

Now is the time for **all** good men to come to the aid of the party. To be or not to be, that is the question.

Whether 'tis nobler in the mind to suffer the slings and arrows of outrageous fortune, or to take arms against a sea of troubles, and by opposing, end them?

(NOT YET A DISK OR TRANSMISSION FORMAT)

Generally format names refer to disk or transmission formats, and not to open structures lying around in databases. However, that's how we're thinking of it for now.

THE NAME: XPLODED OPEN FORMAT

Note that while the designation begins with X, the "X" does not stand for "Xanadu," and we are proposing this as a general approach.

Xanadu Light: Session and Protocols

© 1994 Theodor Holm Nelson, Xanadu™ On-Line
Publishing, 3020 Bridgeway #295, Sausalito CA 94965.
Tel. 415/ 331-4422, fax 415/ 332-0136.

"Xanadu," "Xanadu Light," "HyPerformance" and the
Eternal Flaming X symbol are trademarks of Project
Xanadu.

THE SESSION

BEGINNING THE SESSION

Validation of account
The ticket

REQUEST OR PURCHASE

Present ticket
Make request
Content bytes
Links
Text scan

Delivery of receipt and contents

CONTINUING THE SESSION

Present ticket portion of previous receipt

ENDING THE SESSION

PROTECTIONS AND VALIDATION

Validating the customer

SESSIONS WITH CUSTOMERS

SESSIONS WITH OTHER NODES

Protocol with other nodes
Financial transfer with other nodes

GENERAL DIALOG OF INTERACTION

The user will send for contents bytes or a set of links.

The user will pay for that delivery (including royalty on the contents bytes).

The system will deliver the content bytes or links.

The system will deliver a receipt, which serves as a re-entry ticket.

SESSION THREAD

To begin, the user will present identification and get a session thread ticket. The ticket permits re-entry to the session without re-identification or re-establishment of credit. After the first interaction, each receipt serves as the next ticket.

THE RECEIPT

Whenever a portion of material is sent out to a customer, a receipt is sent along with the portion to identify that portion. The user's system may store the receipt with the portion in order to keep acquired materials manageable.

The receipt is hashed against the piece as a form of authentication. The purchaser may present this receipt as proof of the purchase if there are disputes on billing.

Receipts are demonstrably consecutive.

The receipt also provides authentication of the data, through hash codes. However, the hash is also against the purchase information, so that the material can only be authenticated along with who purchased it and when.

Xanadu Light: The Single-System Demo

© 1994 Theodor Holm Nelson, Project Xanadu, 3020 Bridgeway #295, Sausalito
CA 94965. Tel. 415/ 331-4422, fax 415/ 332-0136.

"Xanadu" and the Eternal-Flaming-X symbol are trademarks of Project
Xanadu.

A MINIMAL DEMO VERSION

Our credibility will be enhanced enormously if we can get up a demo system, even if it does not at first use real money or connect with other Xanadu nodes.

Such a system will be welcome in various venues, probably including the Exploratorium, and on the Internet.

Here is what we need:

FUNNY MONEY

There need be no actual payment or fulfillment.

THE STANDARD TABLES

The standard unit management tables will be put up, but since there will be only one disconnected node there will be no need for harpoons or barnacles.

TEXT ONLY, STORED IN THE DATABASE

Initial data will only be text, stored in the database system itself rather than in separate files.

A SMALL NUMBER OF LINK TYPES

A small number of link types will be included.

TRANSLUSIONS MUST BE SUPPORTED

Transclusions (of text only, not links) must be supported.

ROYALTY ACCOUNTING

So that people have a sense of the payment structure,
royalties will accounted both for users and publishers--

"Your account would have been charged XXX
nanobucks for that piece."

"You would have received YYY nanobucks this
week."

Xanadu Light: Overview

LONG
VERSION

© 1994 Theodor Holm Nelson, Xanadu™ On-Line Publishing,
3020 Bridgeway #295, Sausalito CA 94965. Tel. 415/ 331-4422, fax
415/ 332-0136.

"Xanadu," "Xanadu Light," "HyPerformance" and the Eternal
Flaming X symbol are trademarks of Project Xanadu.

Xanadu has long been a software design, an ideal, and an action plan for
a worldwide linked electronic publishing system.

(Note that the system was also designed from the beginning for
version and document management on a personal and corporate
scale, but version management has been dropped from the current
system. We expect to put in a form of version management at a
later time.)

Openness and Freedom

We believe the Xanadu system offers unique solutions to
issues of royalty, rights and re-use.

Our electronic publishing model has been unique: a scheme
for open, integrated universal electronic publishing with
freedom for anyone to publish. Anyone may publish any
form of data, and anyone may publish links to already-
published material.

Perhaps most important, anyone may re-publish material
already on the network without restriction, excerpted at will
and presented in any new context. A few simple rules
operate automatically to maintain ownership, authorial credit
and accounting.

Really a Business Model; Implementation Secondary

Xanadu is a business model to achieve this openness and
freedom. It is a method for the sale of copyrighted material
on networks. All parties agree by contract to a standard
form of sale and re-use.

This is a highly-integrated business model based on an exact
delineation of parties, contracts, and arrangements. Rather
than being restrictive, however, this system defines an

extremely broad playing field for publication, communication, education, scholarship, business communication, entertainment, multimedia, and other art forms, and general use.

The type of implementation is secondary. Different implementations and protocols may coexist and operate together under this framework.

Mix-and-Match Boilerplate

The system is defined so that all parts of a published document may be purchased a la carte in pieces. Anything already published within the system may also be re-used and re-published with ease within the system. Thus text, graphics, audio, animations, simulations may be recombined on a mix-and-match basis. This is true for links as well.

Re-Use

All parties agree by contract that materials may be re-used freely, but only by virtual inclusion in new Xanadu documents. Thus everyone is free to use previous materials in new ways, but royalty and credit automatically go to the rightsholder.

Clean Data

Links and markers are local applicative substructures, and not embedded in any way. This better facilitates re-use of the material.

Automatic Royalty

Each time a customer buys a fragment of any data-- text, graphics, audio, 3D models, whatever-- a proportional royalty payment automatically goes from the customer to the publisher. Anything may be bought in small portions.

Licensed Service Providers

The plan has also been to license, or franchise, service providers, who will set up computers and data storage using our software, and make the service available to customers locally and internationally. Customers may modem in to their local service providers. The service providers, in turn, will be able to send for materials they do not have locally.

Xanadu Light

XANADU LIGHT is the new implementation now being planned for implementation with conventional database on the Internet.

What follows is a design specification for that Xanadu Light.

00. THE BUSINESS MODEL

The service provider is not responsible for the contents.

The publisher is responsible for contents, and pays for storage.

The reader/user pays for delivery, including both a service charge to the service provider, and a royalty to the publisher. This royalty is exactly proportional to the number of bytes, at the royalty price set by the publisher on that document, or set by the publisher on a particular segment of that document.

THE CONTRACTS

Contracts bind the system.

Publisher --

is responsible for the contents and relinquishes context control of the materials in the Xanadu network in return for royalty and credit. Publisher retains all other rights.

Reader --

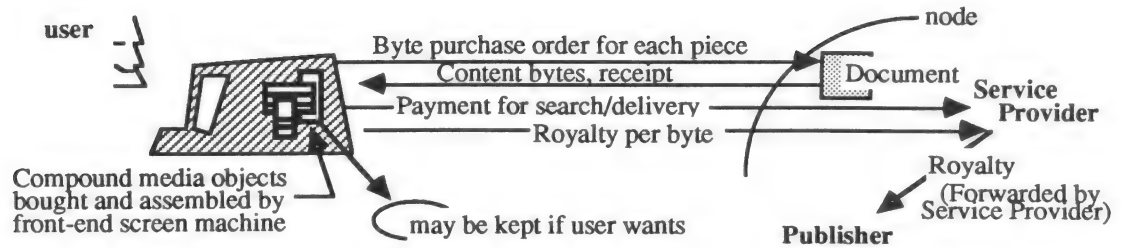
agrees to terms of purchase, and agrees not to redistribute the materials except through transclusion into documents published within the Xanadu network.

Service provider --

agrees to maintain integrity of the document, use the software provided, and remand royalties and other payments as called for.

0. THE MODEL OF INTERACTION

The user perceives a point-and-click universe. In actuality, each click makes another small purchase of content bytes or links from the network.



THE RECEIPT

A receipt will be sent with each portion. This will assist the user, or the user's system, in filing the portion, if the user chooses to keep it. The receipt will also authenticate, by means of a hash code, the user's legitimate purchase of this portion.

CLIENT SOFTWARE

Basic purchase will be simple, allowing a minimal interface for purchasing portions. A higher-performance interface will be point-and-click with material appearing in separate Mac-style windows.

RECOMMENDED LAYOUT

There have been various complex arrangements (especially SGML) for the framing and presentation of text, especially local assignment of layouts to paragraph types. We will have such an arrangement, but within the framework of local applicative substructures.

THE HIGH-PERFORMANCE CLIENT

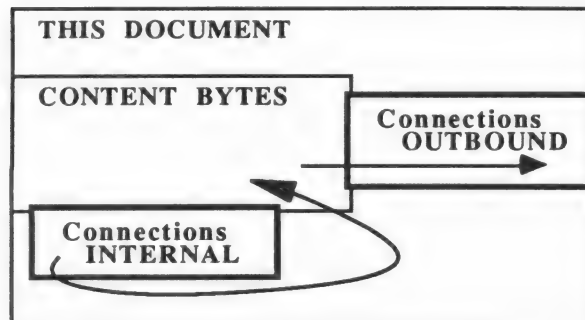
A very high-performance interface will also be specified at a later time.

For a higher level of performance, with panning, scrolling and zooms, as well as other effects, we will be specifying at a later time a high-performance client language called HyperFormance™. This will be closely related to multilayer compositing methods in video, and extend the video EDL (Edit Decision List).

1. GENERAL MODEL OF A DOCUMENT.

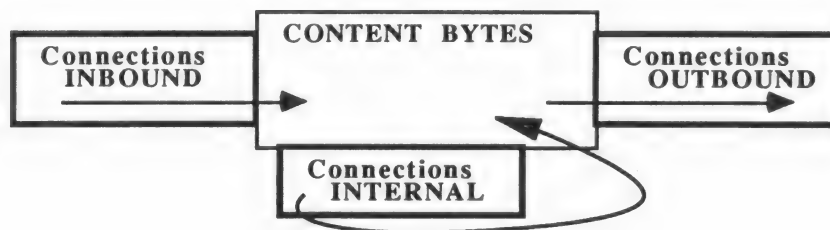
A document consists of contents bytes (text, graphics, etc., ORIGINATING IN THIS DOCUMENT), and connections both in and out of the document.

The structure of document connections is APPLICATIVE, meaning that no codes are embedded. Structure is managed within the database system.



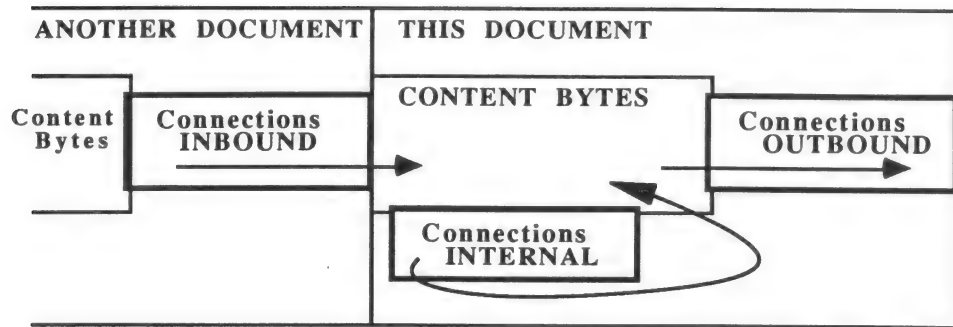
SYMMETRY

In relation to other documents, these connections create a symmetrical structure of connections. It is important to understand this symmetry, which we will discuss later.



OWNERSHIP OF CONNECTIONS

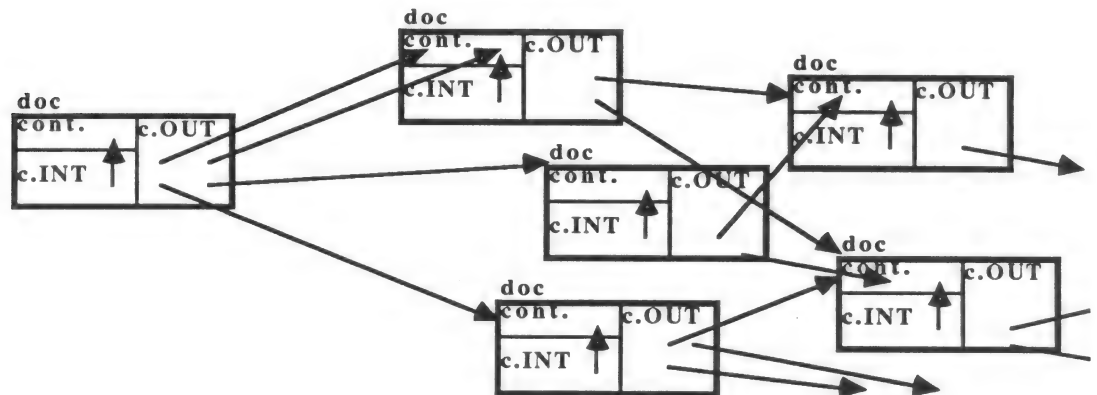
All connections are owned. One document's inbound connection is another document's outbound connection.



Connections into a document are owned by other documents where they originate.

THE PARTS MAKE A DOCUVERSE

Taken all together, these connected documents make up a docuverse. No other parts are needed.



2. TYPES OF CONNECTIONS

There are two types of connections: links and transclusions.

A link is an arbitrary connection of any type.

A transclusion means a new instance: "bring in this material here," even though place of origin is different.

TYPES OF CONNECTION

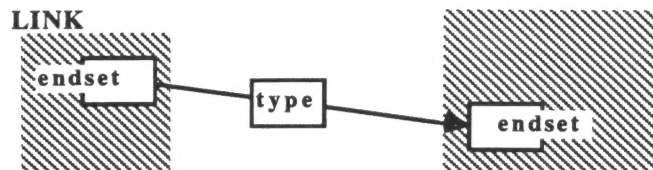
link



transclusion



LINKS.



A link is a connector, of arbitrary extensible type, between part of a document and another part of a document. The link may be within or between documents.

TYPES OF LINKS

There can be many types of link, in an ever-extensible list. A short beginning list:

- Subject (what commentator thinks this is about)
- Comment
- Disagreement
- Endorsement
- Evidence
- Example
- Endorsement
- Graphical illustration

LINK ENDSETS

The endset is the material a link is attached to at either end (eg text, graphic, "hot button").

In Xanadu Light, there will be many types of endsets. These types will simply tell the system where the link is considered to be attached.

ENDSET COUPLING TYPE

The endset coupling specifies how it is attached: to a point, to a span of bytes, an area of picture, etc. Various different coordinate-spaces may be defined for this coupling.

Couplings can also be Deep or Surface. Deep couplings reach to data structure, whereas surface couplings reach the result of projecting the data structure. Example: a deep coupling to a PostScript document would couple to text bytes inside the original PostScript code, a surface coupling would couple merely to an area of the output surface generated by the PostScript program.

LINK DIRECTIONALITY, VISIBILITY, FOLLOWABILITY

All Xanadu links can be seen from either end and followed from either end. Some people call this "bidirectional." This

is incorrect. All our links are *bivisible* (can be seen from both ends) and *bifollowable* (can be followed from both ends).

Links are usually *directional*, that is, asymmetrical in meaning. Very few link types are symmetrical ("is related to" would be one possible example).

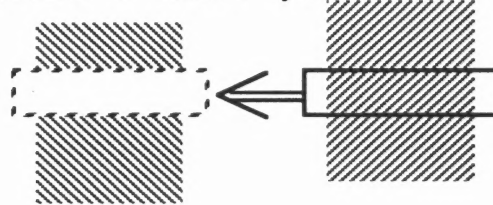
TRANSCLUSIONS

A transclusion means "bring this material in here." The formal definition: virtual inclusion across a document boundary.

The material is not copied into the new document, but always newly-purchased from the original, or a functioning instance of the original.

- Content bytes, such as text and graphics, may be transcluded.

transclusion of content bytes



- Links themselves may be transcluded. In practice this means that a connector of a certain type, and either its from-set or its to-set is transcluded.

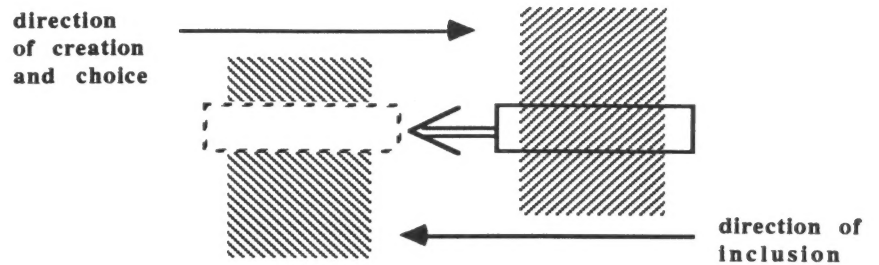
transclusion of link



DIRECTIONS OF A TRANSCLUSION

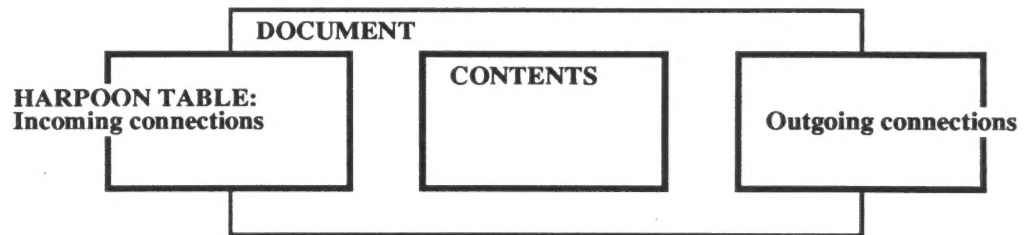
Transclusions, like links, are bivisible and bifollowable. Transclusions are directional. To simplify things we say that a transclusion that brings in material is an outbound connection. But there are of course two directions: the direction in which the material has been chosen and the transclusion has been created (the *direction of creation and choice*), and the direction in which the material flows to be included (the *direction of inclusion*).

DIRECTIONS OF A TRANSLUSION

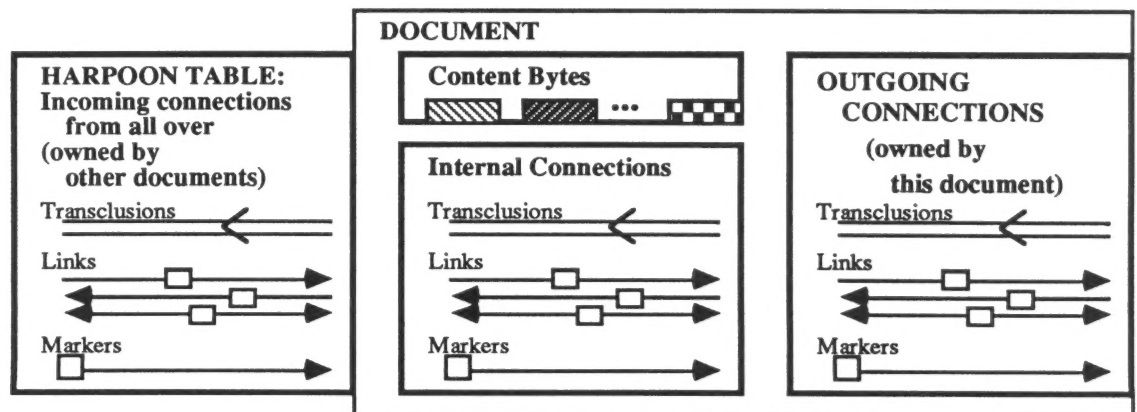


3. OVERVIEW OF A DOCUMENT IN DETAIL

Recall the symmetry of a document, mentioned earlier. We will be storing a document's incoming connections with it in what we will call a Harpoon Table.



Let us add to this overview the different parts we have discussed. The symmetry is still there, but with details showing the parts and their ownership.



4. STORAGE IN XANADU LIGHT

There will be two types of storage in Xanadu Light:

- content files, which may be anything that can be stored in a computer file;
- database tables, which are the means by which the system will keep track of document structures.